

## Claims

The invention claimed is:

1. A method for checksum generation and utilization, in an apparatus for performing modulo  $N$  multiplication of integers  $A$  and  $B$  in which said modulo multiplication is carried out in  
5  $k$  bit wide portions of the factors  $A$  and  $B$  which are representable and as  $\sum_{i=0}^{m-1} A_i R^i$  and  $\sum_{i=0}^{m-1} B_i R^i$   
where  $R$  equals  $2^k$  and where  $N$  is representable as  $\sum_{i=0}^{m-1} N_i R^i$ , said method comprising the steps of:

operating said multiplication apparatus over a plurality of cycles so as to produce, at each  
cycle  $i$ , the values  $Z_i$  and  $Y_i$  in accordance with a two phase modular multiplication method which  
10 does not require division operation;

accumulating, over said cycles, sums modulo  $(R - 1)$  of the values  $A_i$ ,  $B_i$ ,  $N_i$ ,  $Y_i$  and  $Z_i$ ; and

15 comparing the sum of the  $Z_i$  values with the sum of two products, the first product being  
the product of the sums of the  $A_i$  and  $B_i$  terms, and the second product being the product of the  
sums of the  $N_i$  and  $Y_i$  terms.